be of vital importance to the traders, move so exceedingly slow. The fact is, we require a Minister of Commerce with a competent staff, and the sooner the Government awakes to the fact the better for the country. F. MOLLWO PERKIN.

## NOTES.

IT is probably known to some that a project has been started, and is already well advanced, to found a prize for physics at St. Peter's College, Cambridge, as a tribute to the memory of the late Prof. Tait, of Edinburgh, honorary fellow of the college. Besides members of the college who have heartily taken part in the enterprise, many friends of Prof. Tait, both in Belfast and Edinburgh, have recorded their appreciation of him and of his great services to the advancement of science by joining in this memorial of him at the college of which he was so brilliant a member; and it is believed that others, if they were made aware of the proposal, would desire, for a like reason, to be associated with it. Mr. I. D. H. Dickson, St. Peter's College, Cambridge, will reply to any inquiries, and until more formal thanks are made by the college, will gratefully receive and acknowledge any donations that may be sent to him for the purpose of the memorial.

IT is expected that a monument to the electrician, Zenobe Gramme, will shortly be raised in Brussels. Owing to the efforts of M. Léon Janssen, the general manager of the tramways of Brussels, a committee has been appointed to accomplish this purpose.

WE learn from the *British Medical Journal* that the proposal of the German committee of the Virchow memorial to erect a statue of Virchow in one of the public streets of Berlin, near the place where his scientific work was conducted, will be carried out. Contributions towards this memorial should be sent to the Bankhaus Mendelssohn und Cie, Berlin, W., Jägerstr. 49, 50. An obelisk of unpolished grey granite has been placed over Virchow's grave in the old Matthäikirchof, Berlin. It bears on one side a black marble tablet, on which is inscribed "Rudolph Virchow," and the date of his birth and death.

WE regret to see the announcement of the death, in his seventy-first year, of Prof. Rudolf Lipschitz, the professor of mathematics at the University of Bonn.

THE death is announced of Prof. Alexander Rollet, of Graz, in his seventieth year. He was educated at Vienna, but was deeply influenced by Ludwig, and devoted himself especially to the physiology of the blood and muscles. He was called to Graz in 1863, and was four times rector of that university.

A MESSAGE from Rome, through Laffan's Agency, dated October 20, states that Mount Vesuvius is again active, enormous globes of steam being emitted from the principal crater, accompanied by incessant subterranean rumblings and explosions. A stream of lava is flowing down one side of the volcano.

THE Odontological Society of Great Britain announces that it is prepared to receive applications for grants in aid of the furtherance of scientific research in connection with dentistry. For particulars and forms of application inquiry should be made of the honorary secretary, Scientific Research Committee, Odontological Society, 20 Hanover Square, London, W.

THE new college farm established at Madryn, midway between Aber and Llanfairfechan, in connection with the Agricultural Department of the University College of North Wales, was formally opened on October 17 by the Earl of Onslow, President of the Board of Agriculture. In the course of his inaugural address, Lord Onslow advocated the desirability of giving greater attention to forestry in this country.

FOR a long time plague has been endemic in Hong Kong, the disease reappearing after a period of intermission in an inexplicable manner. Prof. Simpson has lately pointed out in a report to the Colonial Office that domestic animals and poultry may contract plague in a latent form from feeding upon plague-infected material, and has suggested that infected food may be a potent source in disseminating the disease. According to the *Times* (October 17) Sir Henry Blake, the Governor, has recently instituted an investigation of the inhabitants and vermin of a large native quarter in the colony certified to be free from plague. This has revealed that a considerable number of the bugs, fleas, spiders and cockroaches contain plague bacilli. Samples of blood from supposed healthy natives upon examination showed the presence of plague bacilli in 5 per cent. of the specimens. Under favourable conditions such infected persons and vermin become possible sources of danger, and sporadic outbreaks must be expected while they are present. It is difficult also to see what measures can be taken to eradicate the disease in these circumstances.

IN the course of the Harveian oration delivered before the Royal College of Physicians on Monday, Dr. W. H. Allchin referred to recent work on radio-activity and the constitution of matter, and its bearing on biological processes. He remarked that as the atomic and molecular theory was utilised to furnish an explanation of that flux of chemical activity which is denominated bioplasm, so have speculations on ionic action been pressed into the same service, and with some promise, wholly hypothetical as they may be. Nerve action is simply electrical action negative ions being released where nerve blends with muscle or where systems of concatenated neurons come into connection. Ion after ion is precipitated, and thus neural conduction takes place. This play of ions is excited or inhibited by the character of the fluids with which the protoplasm is bathed—by the nature, that is, of the ions which these fluids contain. Most effective in stimulating protoplasmic action are such substances as sodium salts, as those of lime restrain it, and since such inorganic bodies are among the products of tissue waste, it may be that in the ions of metabolism are to be found the causes of that rhythmic tendency to activity which nerve cell and muscle fibre alike exhibit. If normal neuro-muscular action may be thus induced, the theory offers a clue to the comprehension of some of the most obscure morbid manifestations of these tissues. In many departments of physiology, notably in that concerned with nerve and muscle and with secretion, a large mass of information has been acquired as the result of experiments, whilst but little has been done towards ascertaining the ultimate structure of the tissues concerned —little, that is, beyond what was known a score of years ago or more. In respect to such tissues as these, microscopic examination would seem almost to have reached its limits, and for the complete comprehension of the physico-

chemical phenomena, more recently ascertained, the problem of the chemical and electrical constitution of the muscle or nerve fibre and of the gland cell awaits solution.

A REPORT on the photogrammetric measurement of the height of clouds at Simla during the twenty months June, 1900, to January, 1902, by Mr. W. L. Dallas, is published in the *Indian Meteorological Memoirs*, vol. xv. part ii. Only forty-seven good observations were secured, as it frequently happens that the lower clouds are ordinarily thick and below the level of the observatory (7224 feet). These observations give the mean height of cirrus 30,440 feet above Simla, and the maximum height 38,440 feet; of cumulus the mean and maximum heights are 7304 feet and 14,318 feet respectively.

WE have received from Mr. W. G. Davis a work on the climate of the Argentine Republic, compiled from observations made to the end of the year 1900. All the meteorological elements have been submitted to a careful and elaborate discussion, and the work is a most valuable contribution to the climatology of the South American Continent. In a general outline of the treatise, Mr. Davis points out that, in a country which embraces 33° of latitude, and the surface of which slopes from the Atlantic to the snow-clad Andes, great differences must prevail in the atmospheric conditions. In the narrow zone lying to the north of the Tropic of Capricorn, the mean annual temperature varies from 23° C. on the coast to less than 14° at the western limits, while the rainfall decreases from 1600 mm. to less than 50 mm. At 8° or 9° farther south, we find, in the Pampas, a mean temperature of 19°, which rapidly decreases towards the slopes of the Cordilleras; in the eastern part of Entre Rios the rainfall is 1000 to 1200 mm., and diminishes to less than 100 mm. in the province of San Juan. At 10° further south there is little difference in the isotherms (13° or 14°) between the Atlantic and the Andes, while the rainfall (200 to 400 mm.) is practically the same. At the extreme south of the Republic the climate is rigorous; in Tierra del Fuego the summer mean temperature is 8° to 9°, and the winter 2° to 3°. Rains are frequent and no month is free from snow. At Staten Island the mean annual precipitation is 1400 mm., while in Tierra del Fuego less than half this quantity falls.

MR. R. W. PAUL has sent us his new catalogue of electrical testing instruments. The list, in addition to the usual resistance boxes, bridges, galvanometers, and other familiar testing instruments, includes several new pieces of apparatus and new patterns. Amongst these may be noticed the new pattern of Kelvin double bridge for the measurement of low resistances; there is also a new model Ayrton-Mather narrow-coil galvanometer having conveniently interchangeable coils. A new set of standard wattmeters, designed by Messrs. Duddell and Mather, is included in the list; these are constructed as much as possible from insulating materials, and range from 0·01 watt to 200 kilowatts. We hope to have an opportunity of describing them more in detail later. An interesting type of resistance has been designed for use with these wattmeters; it is made of silk-covered manganin wire, which is woven into a fabric with silk threads, thus giving a high resistance free from errors due to capacity or self-induction.

WE have received from Mr. C. E. Kelway a description of his system for warning ships at sea of approaching danger by equipping lighthouses with Hertzian signalling apparatus. The ships themselves would be fitted with a receiving apparatus which would respond when they came within the range of the wireless signals sent out from the lighthouse; these are to be sent out at regular intervals at the same times as the sound warnings. A ship, by observing the time that passes between receiving the wireless signal and the sound warning, is enabled at once to calculate its distance from the lighthouse; if it now continues on its course for a few miles and then makes a second observation, all the necessary data for ascertaining, trigonometrically, the exact position of the lighthouse are obtained. A special stop-watch reading directly in distances and a special position finder have been devised by Mr. Kelway for use with his system. The system was, we understand, submitted to the consideration of the recent Berlin Wireless Telegraphy Conference; it illustrates one of the many ways in which wireless telegraphy may be made of service to ships.

FROM the *Bulletin* of the Cracow Academy we have received reprints of several papers by Profs. Ladislaus Natanson and St. Zaremba dealing with certain points in the dynamical theory of viscosity.

MESSRS. TEUBNER, of Leipzig, announce the forthcoming publication of a new work entitled "Encyklopädie der Elementar-Mathematik," under the joint authorship of Profs. H. Weber (Strassburg) and J. Wellstein (Giessen). It is specially written for teachers, and will consist of three volumes dealing respectively with elementary algebra and analysis, elementary geometry, and applications of elementary mathematics.

THE *Proceedings* of the Edinburgh Mathematical Society for 1902–3 contain the reprint of some correspondence between Robert Simson (1687–1768, professor of mathematics at Glasgow, 1711–1761), Matthew Stewart (1717–1785, professor of mathematics at Edinburgh 1747–1772), and James Stirling, F.R.S. (1692–1770, author of works on Newton's cubic curves and on the calculus). The correspondence in question was bought at the Gibson Craig sale of manuscripts by Mr. J. S. Mackay in 1887.

THE *Bulletin* of the American Mathematical Society for October contains an English translation of Poincaré's review of Hilbert's "Foundations of Geometry." Hilbert's monograph is undoubtedly a classic, and Poincaré's comments upon it, as might be expected, are full of interest. One passage may be quoted as dealing with a misunderstanding which is too common. "Some people have gone so far as to . . . ask whether real space is plane, as Euclid assumed, or whether it may not present a slight *curvature*. They even supposed that experiment could give them an answer to this question. Needless to add that this was a total misconception of the nature of geometry, which is not an experimental science."

IN the *American Naturalist* for August, Dr. E. W. Doran emphasises the importance of the use of vernacular names for animals, and urges that, when these are of a composite nature, a uniform method in regard to the use of hyphens should be adopted in zoological literature. The rules he proposes with a view of attaining this desirable end will, we think, meet with the general approval of English writers.

MR. C. R. EASTMAN, on morphological grounds, expresses, in the *American Naturalist*, his disbelief in Dr. Patten's assertion that Cephalaspis was provided with a fringe of jointed and movable appendages along the ventral margin of the trunk. No such appendages exist in the allied Pterichthys, and it seems incredible that a vertebrate can possess more than two pairs of limbs. In these respects the writer has the support of Dr. Gaskell.

AT the conclusion of a paper on reptiles and amphibians from Arkansas and Texas, published in the *Proceedings* of the Philadelphia Academy for August, Mr. W. Stone discusses their bearing on previous views as to the zoo-geographical zones of this part of the United States. He concludes that the boundary between the Austro-riparian and Sonoran areas, so far as reptiles are concerned, lies between the 96th and 98th meridians of longitude, that the Texan district of Prof. Cope should be referred to the Austro-riparian instead of to the Sonoran province, and that transcontinental zones of distribution are not indicated by reptilian evidence. The marked faunal division between the 96th and 98th meridians is due to this line marking the limits of the heavy rainfall of the Gulf coast.

A CURIOUS problem is presented by the hermit-crab. As is well known, these crustaceans present a marked asymmetry, which nearly always takes the form of a dextral spiral—in correlation with the circumstance that they generally inhabit dextral molluscan shells. Is, then, this asymmetry due to this habit, or was it pre-existent? In discussing this question in a paper on the metamorphoses of the hermit-crab, published in the *Proceedings* of the Boston (U.S.) Natural History Society, Mr. M. T. Thompson concludes that it cannot at present be definitely answered, owing to our imperfect knowledge of the relationships of the different generic representatives of the group. Nevertheless, the asymmetry is structurally adapted to the conditions imposed by the mode of life in question, and the presumption is accordingly very strong that it was from the first the result of a sojourn in dextrally spiral shells.

MR. M. J. NICOLL, who in 1902–3 accompanied the Earl of Crawford in his yacht; the *Valhalla*, round the world as naturalist, and made good collections in several branches of natural history, will again join the *Valhalla*, in the same capacity, next month for a winter tour in the West Indies. Mr. Nicoll's specimens collected during the last voyage are being examined and arranged at the British Museum, to which Lord Crawford has presented them. Mr. Nicoll's ornithological notes made during the voyage will be published in the next number of the *Ibis*.

IT has always seemed strange that so large and strongly marked an animal as the okapi (*Okapia johnstoni*) should have remained unknown to Europeans until its recent discovery on the Semliki by Sir Harry Johnston. But it would now appear, as is suggested by Herr Hesse, that a prior well-known African traveller, Wilhelm Junker, had obtained an imperfect skin of this animal at Zemio, in the Welle-basin, twenty years ago, although he did not recognise the nature of it, and was inclined to refer it to the water-chevrotain (*Hyomoschus aquaticus*). But as the animal was called by the natives "makapi," and was "of the size of a dwarf antelope," it seems more probable that the skin in question was that of a young okapi (see *Journ.* R.G.S., vol. xxii. p. 459).

IN the October number of *Climate* Dr. Louis Sambon continues his series of articles on the chief disease scourges of the tropics, dealing with malaria, yellow fever, cholera, plague and sleeping sickness. Another article of interest discusses the results obtained by the campaign against mosquitoes in various parts of the world.

THE Corporation of London has approved and adopted a series of regulations drafted by its Public Health Department for the sanitary control of the milk supply of the City. Some of these deal with the registration of the premises and their sanitary condition, contamination of milk, milk from diseased cows, &c. Others seek to secure the cleanliness of milk-shops and vessels, and the safeguarding of the milk-supply against infection from without.

THE health of the great armies of Europe is discussed by Dr. V. Lowenthal in an interesting statistical article in the *Revue générale des Sciences* (September 30). Of the armies of the six great Powers, France, Germany, Austria, Russia, Italy, and England, France heads the list both in the total mortality rate and in the attack rate. On the whole the German Army is the most healthy, then comes the Italian, and then the British. But for the enormous incidence of venereal affections, the latter, however, would in all probability appear as the most healthy.

"THE GEOLOGY OF THE COUNTRY AROUND TORQUAY" is the title of a memoir by Mr. W. A. E. Ussher that has just been issued by the Geological Survey The author has for many years been engaged in a detailed examination of the Devonian rocks, and he gives full particulars of the complex structure of the area and of the several subdivisions of the strata, with lists of fossils. Useful tables are given showing the Continental equivalents. The terra-cotta clays of Watcombe, and the red sandstones and conglomerates that form portions of the picturesque cliffs, are grouped as Permian. Cavern-deposits, Raised Beaches, and other superficial deposits are described, and there is a short chapter on economics.

MESSRS. DAWBARN AND WARD, LTD., are publishing a series of penny pamphlets dealing with various subjects of interest to practical photographers. The first number in the series discusses the prevention and cure of halation, and the fourth number the camera and its movements.

THE ninth annual volume—that for the present year—of the *Reliquary and Illustrated Archaeologist* has been issued by Messrs. Bemrose and Sons, Ltd. The volume contains the four quarterly issues of the magazine which have been published this year, and most of the articles are excellently and profusely illustrated. The publication appeals preeminently to antiquarians, ethnologists and archæologists.

MR. JOHN MURRAY has published a cheap edition—five shillings net—of Nasmyth and Carpenter's classical work on "The Moon." The original work was published thirty years ago, and was reviewed in these columns on March 12, 1874 (vol. ix. p. 358). Three editions of the book were issued, but they have been out of print for several years, and the publication of the work in a popular and compact form will be welcomed by many students of astronomy.

A FIFTH edition of the "Manual of Pathology" by the late Prof. Joseph Coats has been published by Messrs. Longmans, Green and Co. The new edition has been revised throughout by Prof. L. R. Sutherland, and considerable alterations have been made without interfering materially with the original plan of the book. The chapter on bacteriology has been omitted, and the illustrations have been increased in number from 490 to 729. Two new coloured plates have also been added.

THE fourth revised edition of Prof. Max Verworn's "Allgemeine Physiologie" has been published by Mr. Gustav Fischer, Jena. The first edition of this well-known work was reviewed in NATURE in 1895 (vol. li. p. 529). A translation of the second edition, by Dr. F. S. Lee, was published in 1899, and was also noticed at length in these columns (vol. lx. p. 565). Since the third German edition was published in 1901, progress has been made in the

knowledge of the physiology of the cell, and the sections devoted to this subject have been carefully revised for the new edition now available.

WITH the advance of scientific education in this country scientific instrument makers are continuously bringing out improved forms of apparatus. We have recently received from Messrs. Brewster, Smith and Co. an improved form of a "double surface condenser." This is one of the most compact and efficient condensers which has come before our notice. We have tested it for condensing such volatile substances as ether, carbon disulphide, and acetone, and have found that even with rapid distillation the condensation is very complete. Generally speaking, in order to condense these substances satisfactorily, it is necessary to employ a very long condenser; of course, this means using a great amount of bench space. As the new condensers are used in a perpendicular position, the saving in space is very great.

MESSRS. BREWSTER, SMITH AND CO. have also sent us a "new Bunsen burner and midget furnace." It can hardly be said that the Bunsen burner is new, but the combination of furnace and burner is very convenient. The makers claim that marble is reduced to quicklime in ten minutes. This will, of course, to a large extent depend upon the quantity of marble taken in the first place—we find that from one to one and a half grms. is readily reduced to quicklime in twenty minutes. These little furnaces are not only useful for reducing calcium carbonate to lime, but also work very well in fusion experiments.

THE measurements by Biltz and Preuner of the density under different pressures of sulphur-vapour at 448° have usually been regarded as indicating that the vapour is composed of $S_8$ and $S_2$ molecules, and that the molecule $S_6$ does not exist. The application to the isothermal of the law of mass-action, discussed by Preuner in the *Zeitschrift für physikalische Chemie*, shows that this theory is inadequate, and that the vapour must contain molecules intermediate in complexity between $S_8$ and $S_2$. The proportions by volume of the constituents are calculated to be, under 10·4 mm. pressure, 29·2 per cent. $S_8$, 19·0 $S_6$, 19·7 $S_4$ and 32·1 $S_2$, and under 453·4 mm. pressure, 77·8 $S_8$, 15·1 $S_6$, 4·7 $S_4$ and 2·4 $S_2$.

SINCE Beckmann showed that iodine in all solvents has the molecular weight $I_2$, it has been suspected that the formation of violet or brown solutions is dependent upon the extent to which the iodine combines with the solvent. By means of comparative experiments on the solubility of iodine and the periodide $N(CH_3)_4I_9$, described in a recent number of the *Zeitschrift für physikalische Chemie*, Strömholm has obtained evidence that iodine actually combines with water, alcohol and ether, forming brown solutions, whilst the violet solutions in carbon disulphide, benzene and chloroform contain uncombined iodine; similarly it is shown that iodine has little tendency to combine with methyl iodide when dissolved in ether, or with sulphur dissolved in carbon disulphide.

THE additions to the Zoological Society's Gardens during the past week include a Black Lemur and young (*Lemur macaco*) from Madagascar, a Brazilian Hare (*Lepus brasiliensis*) from Brazil, eight Hamsters (*Cricetus frumentarius*), a Snow Bunting (*Plectrophenax nivalis*), four Lacertine Snakes (*Coelopeltis monspessulana*), two Dark-green Snakes (*Zamenis gemonensis*), a Vivacious Snake (*Tarbophis fallax*), European; three Cuban Snakes (*Liocephalus andreae*) from Cuba, two Garter Snakes (*Tropidonotus ordinatus*), a Prickly Trionyx (*Trionyx spinifer*) from North America, a South Albemarle Tortoise (*Testudo vicina*) from Galapagos, a Wrinkled Terrapin (*Chrysemys scripta rugosa*) from the West Indies, two Amboina Box Tortoises (*Cyclemys amboinensis*) from the East Indies, two Annulated Terrapins (*Nicoria annulata*) from Western South America, a Horned Lizard (*Phrynosoma cornutum*) from Mexico, a Carinated Lizard (*Liocephalus carinatus*) from the West Indies, two Hispid Lizards (*Agama hispida*) from South Africa, two Scoresby's Gulls (*Leucophoeus scorebii*) from Chili, deposited; a Tasmanian Devil (*Sarcophilus ursinus*) from Tasmania, received in exchange.

## OUR ASTRONOMICAL COLUMN.

SEARCH-EPHEMERIS FOR COMET 1896 v.—A further portion of the search-ephemeris for Giacobini's comet (1896 v.), published by Herr M. Ebell in No. 3898 of the *Astronomische Nachrichten*, is given below. As will be seen from this ephemeris the computed brightness is now decreasing, although the comet should be in a favourable position for observers in the northern hemisphere:—

12*h*. *M. T. Berlin.*

| 1903 | α h. m. s. | δ ° ′ | log *r* | log Δ | Brightness. |
|---|---|---|---|---|---|
| Oct. 28 | 3 54 51 | + 8 6·5 | 0·2943 | 0·0130 | 2·21 |
| Nov. 1 | 3 51 18 | + 7 23 8 | | | |
| ,, 5 | 3 47 33 | + 6 43·7 | 0·3055 | 0·0242 | 1·99 |
| ,, 9 | 3 43 40 | + 6 7·0 | | | |
| ,, 13 | 3 39 46 | + 5 34·0 | 0·3165 | 0·0410 | 1·75 |
| ,, 17 | 3 35 56 | + 5 5·3 | | | |
| ,, 21 | 3 32 15 | + 4 40·9 | 0·3274 | 0·0633 | 1·51 |
| ,, 25 | 3 28 50 | + 4 21·2 | | | |
| ,, 29 | 3 25 44 | + 4 6·0 | 0·3381 | 0·0901 | 1·27 |

A NOVEL FEATURE FOR GEODETICAL INSTRUMENTS.—In a paper contributed to No. 26, vol. iii., of the *British Optical Journal*, Sir Howard Grubb describes a novel feature in geodetical instruments which replaces the half-silvered, half-plain piece of glass generally used in such instruments by a piece of glass having a thin film of lead sulphide deposited on its surface. This film both reflects and transmits the incident light, and by varying its thickness the proportion of transmitted to reflected light may be varied.

Taking the case of the prismatic compass as an illustration, the rays of light from the object the position of which is to be determined are transmitted by the film of lead sulphide, and, at the same time, the previously collimated rays from the compass card are reflected by it. As both sets of rays are parallel, and the reflection of the card is superimposed on the image of the distant object, parallax does not interfere in the observations, and the position of the eye may therefore be changed without introducing any error into the reading, thereby rendering it possible to make the readings much more quickly and accurately than when using the older forms of reflecting-transmitting apparatus.

THE PATH OF COMET 1894 I. (DENNING).—No. 2 of the *Mitteilungen* of the Heidelberg Observatory contains a paper by Dr. P. Gast on the observations and calculations of the path of comet 1894 I.

The first part is devoted to a series of new observations of the comparison stars made during the year 1902, and is followed by a collection of the observations of the comet which were made at various observatories, then the various observations are compared among themselves and with the computed elements of this comet. The paper concludes with a discussion of the perturbations produced by Jupiter and the finally deduced elements. In a supplementary list the positions of eighty-eight reference stars for the year 1900 are given, the value of the precessional constant, the secular variation, and the star's proper motion being stated in each case.

OBSERVATIONS OF MARS.—In the October number of the *Bulletin* de la Société astronomique de France, MM. Flammarion and Benoit publish the results of their observations of Mars made at Juvisy during the last opposition of that planet. Although the planet was nearer to the earth during this opposition than it was in 1901, the unfavourable meteorological conditions prevented the making